BIG ACADEMIC OPEN COURSE BASE ON CLOUD COMPUTING

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Abstract

BAOC is a proposal based on the MOOC modality for school courses. Approximately 90% of the course activities are carried out online, as in the case of MOOCs, this allows the course to have a greater coverage and the number of students attended increases. In contrast to the MOOC, in our model the course takes place in an academic context, where a grade must be assigned to the student at a pre-established time. For this reason, is include face-to-face activities to validate that the student acquired the knowledge and skills raised in the course objectives. Our model is not as flexible as the MOOC, it integrates accompaniment mechanisms that favour motivation and follow-up on the progress or lag of the student.

The technological architecture used for the implementation of the BAOC integrates a virtualized server set: Application Server (here reside the available applications as services), a Web Server as the basis of the Virtual Learning Environment (Sakai) and a Database Server (which manages the structured information). It also includes a Video Streaming System for online session support in real time and a File Server (to share documents).

BAOC was applied during 3 years in the course of Numerical Methods in Engineering, in the Division of Basic Sciences and Engineering of the Metropolitan Autonomous University, with 1165 students participated. It was observed that the retention index oscillated between 68% and 74% and was decreasing up to 46%, however, in comparison with a MOOC course they are acceptable percentages. While for the approval index, is observed that in autumn trimester it oscillates between 54% and 65%, and in the spring trimester the percentage of approval increases up to 77%.

Keywords: MOOC, BAOC, b-learning, cloud computing.

1 INTRODUCTION

The human and physical resources of the Higher Education Institutions (HEIs) are not sufficient to meet the demand [1], [2], [3]. The use of virtual learning environments is an alternative that can give attention to a greater number of students, optimizing adequately the physical and human resources of the institution [4].

In the Autonomous Metropolitan University Azcapotzalco Campus (UAMA) during 2011, an average of 2 groups of the Numerical Methods in Engineering (NMI) course were taught, with a capacity of 50 students per trimester attended by a course teacher, for which attention was given a maximum of 300 students per year on average. However, the demand for NMI groups was increased by adaptations made to study plans of 10 Engineering Degrees. Physical spaces and teachers were not enough to meet the demand. So it was necessary to design an additional alternative to the process of teaching and learning to satisfy the demand of Numerical Methods and Engineering, using existing human and physical resources, then the Big Academic Open Course (BAOC) emerged.

On the other hand, cloud computing offers 3 models of network services: Infrastructure as a service (IaaS), software as a service (SaaS), and platform as a service (PaaS) [5]. To attend a moderate to high enrollment in e-learning platforms in different teaching modalities, there is a tendency to use Service Oriented Applications (SOA) as support infrastructure for Learning Management Systems (LMS) [6] [7]. We must consider that the performance of the hardware is the limit of these systems, so a scalable and highly available architecture was designed. The cloud computing by having servers in a virtualized cluster and the use of software as a service, favors a scalable and highly available architecture [8]. This type of architecture is recommended in Higher Education Institutions such as UAMA [9], [10].

When the LMS is implemented in the cloud computing, benefits are obtained such as: scalability and flexibility when distributing resources, dynamic storage, computing power (processors and memory), this generates savings in its implementation [11], [12].

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